

CYTOGEOGRAPHY OF *DICENTRA EXIMIA* (KER) TORR.

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ABSTRACT

Determinations of chromosome numbers from 8 populations of *Dicentra eximia* (Ker) Torr. throughout its natural distribution are reported.

INTRODUCTION

The fumariaceous genus *Dicentra* Bernh. comprises some 20 species of herbaceous perennials and annuals, distributed throughout the north temperate zone in Asia, and eastern and western North America, primarily in mountainous regions (Stern, 1961; 1967). Best known among the North American representatives are the relatively small, early spring-flowering *D. cucullaria* and *D. canadensis*, the larger *D. eximia*, of the Appalachian region, and its western counterpart, *D. formosa*. *D. eximia* and *D. formosa* are well-known ornamentals, having been under cultivation in North America and Europe for more than 150 years. The two species appear to be closely related, and a number of artificial hybrids between certain forms of *D. formosa* and *D. eximia* have been produced (Stern and Ownbey, 1971). Self-incompatible clones of the two species cross freely when grown together, but the widely disjunct distributions preclude the likelihood of natural hybrids occurring, and none is known. Chemical and slight palynological differences between the two species have been demonstrated (Fahsel and Ownbey, 1968; Stern, 1962), and different chromosomal races of *D. formosa* have been identified (Stern, 1968). This study was undertaken to determine if similar chromosomal races occur in *D. eximia*.

MATERIALS AND METHODS

Live plants were obtained throughout the natural range of *D. eximia* in the Appalachian region during the summer of 1963. These were transported to the west coast and maintained under field conditions in Chico, California, and Pullman, Washington. Over several seasons, flower buds were harvested and fixed in a 3:1 mixture of 100% ethanol and 99% propionic acid, and stored, under refrigeration, in 50% ethanol. Chromosome counts were obtained from one to several buds taken from the transplanted specimens. All cytological observations reported here were made on propionocarmine squashes of microsporocytes. Slides were subsequently made permanent and have been retained by the author. Voucher specimens have been deposited in the Herbarium, University of California, Berkeley. The distribution map (Fig. 1) is adapted from Stern (1961), and is based on examination of some 300 herbarium specimens from approxi-

mately 50 herbaria, as well as on field studies. The latter indicate that numerous original localities of the species have now been lost to the encroachments of civilization. The large black dots superimposed on the overall distribution indicate the original locations of the live materials from which chromosome counts were obtained.

RESULTS AND DISCUSSION

The basic chromosome number for Dicentra appears to be $x = 8$, with a series of polyploids having been reported in the subgenus Dicentra, to which D. eximia belongs. (For a survey of chromosome numbers for the genus, see Stern, 1968; Stern and Ownbey, 1971). Bowden (1945) first reported the chromosome number for D. eximia as $n = 8$, based, evidently, on a specimen acquired from a nursery. D. eximia differs from D. formosa with regard to cytology in that no deviation from $n = 8$ apparently occurs throughout its natural distribution (Table 1). This affords little basis for conjecture about the possible evolution of the species. However, a synthesis of information available from gross morphology and anatomy, seed dispersal ecology, and chemistry, suggests the species occupies a position among the more primitive members of the genus (Berg, 1969; Fahselt and Ownbey, 1968; Stern, 1961).

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VOUCHER SPECIMENS

MARYLAND: Allegany Co.: e bank Wills Crk. Gorge, vic. "The Narrows," W. Cumberland, Stern 2022. NORTH CAROLINA: Burke Co.: ravine below Wiseman's View, 4.6 mi s of Linville Falls P. O., Stern 2014. TENNESSEE: Polk Co.: Hiwassee R. Gorge, ca. 0.5 mi w of Reliance, Stern 2010. Sevier Co.: ca. 1 mi e of w boundary of GSMNP, Tenn. State Hwy. 73, Stern 2011. VIRGINIA: Bedford Co.: Sharptop trail, Peaks of Otter, Stern 2020. Augusta Co.: St. Mary's R. Valley, ca. 6 mi sse of Greenville, Stern 2021. Wythe Co.: 1.9 mi n and w of Sylva-tus, Stern 2019W. WEST VIRGINIA: Randolph Co.: 2.6 mi e of entrance to Flatrock Wildlife Management Area, Monongahela Natl. Forest, Stern 2027.

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TABLE 1.

Chromosome numbers in natural populations of Dicentra eximia

Collection	Chromosome No.	No. of counts
Stern 2010	$\underline{n} = 8$	18
Stern 2011	$\underline{n} = 8$	9
Stern 2014	$\underline{n} = 8$	18
Stern 2019W (a white-flowered form)	$\underline{n} = 8$	16
Stern 2020	$\underline{n} = 8$	13
Stern 2021	$\underline{n} = 8$	20
Stern 2022	$\underline{n} = 8$	24
Stern 2027	$\underline{n} = 8$	9

Fig. 1. Distribution of Dicentra eximia. Large black dots indicate populations from which chromosome counts have been obtained.

